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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TSAL, CAROL S W

ART UNIT PAPER NUMBER

2857

DATE MAILED: 02/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,571

Applicant(s)

YOKOYAMA ET AL.

Examiner

Carol S Tsai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16 and 17 is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 8 and 12-15 is/are rejected.
- 7) ☒ Claim(s) 4-6 and 9-11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

At page 6, line 15, "An HDD" should read - - a HDD - -.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 5,790,334 to Cunningham.

Cunningham discloses a method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer (MR transducer heads 108 shown on Fig. 1), comprising: supplying an electric current of a first current value to the electromagnetic transducer and determining a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value (see Fig. 4; col. 3, lines 19-27; col. 8, lines 21-35 and lines 49-60; col. 9, lines 61-63; and col. 10, line 39-60); supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer and determining the physical quantity appearing in the electromagnetic transducer based on the

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electric current of the second current value (see Fig. 4; col. 3, lines 19-27; col. 8, lines 35-39 and lines 49-60; col. 9, lines 63-66; and col. 10, line 39-60); and determining the magnitude of the sensing current based on change found in the physical quantity (see Fig. 4; col. 8, lines 39-48; col. 9, line 66 to col. 10, line 38; and col. 10, line 61 to col. 11, line 24).

As to claim 2, Cunningham also discloses deriving a variation in temperature of the electromagnetic transducer based on the change in the physical quantity when determining the magnitude of the sensing current based on change found in the physical quantity (see Fig. 4; col. 8, lines 39-48; col. 9, line 66 to col. 10, line 38; and col. 10, line 61 to col. 11, line 24).

As to claim 3, Cunningham also discloses deriving an expected lifetime of the electromagnetic transducer based on the variation in temperature when determining the magnitude of the sensing current (see Abstract, lines 14-16; col. 3, lines 53-63; and col. 6, lines 43-54).

As to claim 7, Cunningham also discloses calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value; calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current (see col. 7, line 40 to col. 8, line 20).

As to claim 8, Cunningham also discloses deriving an expected lifetime of the electromagnetic transducer based on the quantity of variation in temperature of the

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electromagnetic transducer when determining the magnitude of the sensing current (see col. 6, lines 43-54).

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Patent No. 6,476,602 B1 to Gray.

Gray discloses a computer-readable storage medium containing program instructions for determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising: computer program code causing a computer to supply an electric current of a first current value to the electromagnetic transducer (see Fig. 6 and col. 4, lines 41-59); computer program code causing a computer to determine a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value (see Fig. 6 and col. 4, line 59 to col. 5, line 30); computer program code causing a computer to supply an electric current of a second current value, different from the first current value, to the electromagnetic transducer (see col. 4, lines 41-59); computer program code causing a computer to determine the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value (see Fig. 6 and col. 4, line 59 to col. 5, line 30); and computer program code

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causing a computer to determine the magnitude of the sensing current based on a change of the physical quantity (see col. 5, line 31 to col. 6, line 38).

As to claim 13, Gray also discloses the storage medium (memory 452 shown on Fig. 6) being a memory chip incorporated in a magnetic disk drive.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,476,602 B1 to Gray in view of U. S. Patent No. 5,790,334 to Cunningham.

As noted above, Gray discloses the claimed invention, except for a receiver for calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value; calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current.

Cunningham teaches calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response

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to supply of the electric current of the first current value; calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current (see col. 7, line 40 to col. 8, line 20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gray's method to include calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value; calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current, as taught by Cunningham, in order to determine the voltage/current (VI) characteristics associated with each MR head.

As to claim 15, Gray also discloses the storage medium (memory 452 shown on Fig. 6) being a memory chip incorporated in a magnetic disk drive.

Allowable Subject Matter

8. Claims 4-6 and 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 16 and 17 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter:

U. S. Patent No. 5,790,334 to Cunningham is the reference closest to the claimed invention. Cunningham discloses a method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer for reading data, comprising: supplying an electric current of a first current value to the electromagnetic transducer for reading data; determining a physical quantity appearing in the electromagnetic transducer for reading data based on the electric current of the first current value; supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer for reading data; and determining the magnitude of the sensing current based on change found in the physical quantity. However, Cunningham does not teach supplying an electric current of a predetermined current value to an electromagnetic transducer for writing data, which is paired with the electromagnetic transducer for reading data and determining the physical quantity appearing in the electromagnetic transducer for reading data based on the electric current of the second current value; and including all of the other limitations in the respective independent claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Yang discloses a hard disk drive and process of controlling the drive by adjusting disk drive parameters in accordance with ambient temperature.

Belser et al. disclose a magneto-resistive (M-R) head having a read element with a servo sensing width as wide as a data track width and a data sensing width of less than one data track width.

Nguyen discloses apparatus and method for simultaneously biasing multiple magneto-resistive read elements in a disc drive head/disc assembly.

Soeno et al. disclose a read/write head including a slider provided with an electromagnetic transducer element (or an optical module), an actuator, and a suspension.

Cunningham discloses a method and apparatus adaptively controlling the bias supply source for magnetoresistive (MR) read heads within a Direct Access Storage Device (DASD) to provide an optimized bias level for the ambient temperature.

Coffey et al. disclose a magnetoresistive read sensor incorporating a granular multilayer sensing element comprising a plurality of layers of generally flat particles of a ferromagnetic material embedded in a nonmagnetic electrically conductive material.

Brannon discloses a read amplifier that is configured for interconnection with a magnetic head through head contacts.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. Tsai whose telephone number is (703) 305-0851. The examiner can normally be reached on Monday-Friday from 7:30 AM to 4:00 PM. If attempts to

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reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703) 308-1677. The fax number for TC 2800 is (703) 308-7382. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2800 receptionist whose telephone number is (703) 308-1782.

In order to reduce pendency and avoid potential delays, Group 2800 is encouraging FAXing of responses to Office actions directly into the Group at (703) 308-7382. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 2800 will be promptly forwarded to the examiner.

Carol S. Tsai

12/30/02


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